



#4

SEQUENCE LISTING

<11> Ditzel, H.
Bullon, D.
Schaller, M.

<120> Autoantibodies to glucose-6-phosphate isomerase and their participation in autoimmune disease

<130> 1361.005US1

<140> US 09/828,708

<141> 2001-04-06

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35 40 45
Trp Ala Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
50 55 60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu
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Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
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35 40 45
Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Thr Glu Phe
50 55 60
Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr
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 35 40 45
 Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
 50 55 60
 Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr
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 35 40 45
 Trp Ala Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
 50 55 60
 Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu
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 Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
 35 40 45
 Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
 50 55 60
 Phe Ser Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Thr Gly Thr Tyr

65				70				75				80			
Tyr	Cys	Gln	Gln	Tyr	Asp	Asn	Val	Pro	Asp	Thr	Phe	Gly	Gln	Gly	Thr
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Arg	Leu	Glu	Ile	Lys	Arg	Thr	Val	Ala							
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			20					25					30		
Lys	Pro	Gly	Gln	Ala	Pro	Arg	Leu	Leu	Ile	Tyr	Gly	Ala	Ser	Ser	Arg
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Ala	Thr	Gly	Ile	Pro	Asp	Arg	Phe	Ser	Gly	Ser	Gly	Ser	Gly	Thr	Asp
		50				55					60				
Phe	Thr	Leu	Thr	Ile	Ser	Arg	Leu	Glu	Pro	Glu	Asp	Phe	Ala	Val	Tyr
65					70					75				80	
Tyr	Cys	Gln	Gln	Tyr	Gly	Thr	Ser	Pro	Leu	Phe	Gly	Gln	Gly	Thr	Arg
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Leu	Glu	Ile	Lys	Arg	Thr	Val	Ala								
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			20					25					30		
Lys	Pro	Gly	Gln	Ala	Pro	Arg	Leu	Leu	Ile	Tyr	Gly	Ala	Ser	Ser	Arg
		35					40					45			
Ala	Thr	Gly	Ile	Pro	Asp	Arg	Phe	Ser	Gly	Ser	Gly	Ser	Gly	Thr	Asp
		50				55					60				
Phe	Thr	Leu	Thr	Ile	Ser	Arg	Leu	Glu	Pro	Glu	Asp	Phe	Ala	Val	Tyr
65					70					75				80	
Tyr	Cys	Gln	Gln	Tyr	Gly	Ser	Ser	Pro	Arg	Thr	Phe	Gly	Gln	Gly	Thr
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Ala	Ser	Gly	Phe	Thr	Phe	Ser	Ser	His	Gly	Ser	His	Trp	Val	Arg	Gln
			20					25					30		

Ala	Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val	Ala	Leu	Leu	Ser	Ser	Asp	Gly
		35					40					45			
Ser	Asn	Lys	Phe	Tyr	Ile	Glu	Ser	Val	Lys	Gly	Arg	Phe	Thr	Ile	Ser
	50					55				60					
Lys	Asp	Asn	Ser	Lys	Asn	Thr	Leu	Tyr	Leu	Gln	Met	Asn	Ser	Leu	Arg
65					70				75					80	
Ile	Asp	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Ile	Ser	Leu	Val	Gly	Thr
			85					90					95		
Thr	Ala	Phe	Asn	Tyr	Trp	Gly	Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	Ser
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Gly	Gly	Gly	Val	Val	Gln	Ala	Trp	Arg	Ser	Leu	Arg	Leu	Ser	Cys	Val
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Ala	Ser	Gly	Phe	Thr	Phe	Ser	Ser	His	Thr	Met	His	Trp	Val	Arg	Gln
		20					25						30		
Ala	Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val	Ala	Leu	Leu	Thr	Met	Asp	Arg
		35					40				45				
Phe	Thr	Ile	Ser	Arg	Asp	Asn	Ser	Lys	Asn	Thr	Leu	Tyr	Leu	Gln	Leu
	50				55					60					
Ser	Ser	Leu	Arg	Pro	Glu	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Thr	Asn	Ser
65					70					75				80	
Glu	Val	Gly	Ala	Thr	Ala	Phe	Asp	Tyr	Trp	Gly	Gln	Gly	Thr	Leu	Val
			85					90					95		
Thr	Val	Ser	Ser												
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Gly	Gly	Gly	Val	Val	Gln	Pro	Gly	Arg	Ser	Leu	Arg	Leu	Ser	Cys	Ala
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Ala	Ser	Gly	Phe	Thr	Phe	Ser	Ser	Tyr	Thr	Phe	His	Trp	Val	Arg	Gln
		20					25						30		
Ala	Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val	Ala	Val	Ile	Ser	Tyr	Asp	Gly
		35					40				45				
Asn	Lys	Lys	Tyr	Tyr	Ala	Asp	Ser	Val	Lys	Gly	Arg	Phe	Thr	Ile	Ser
	50				55					60					
Lys	Asp	Asn	Ser	Lys	Asn	Thr	Leu	Tyr	Leu	Gln	Met	Asn	Ser	Leu	Arg
65					70					75				80	
Val	Glu	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Ile	Ser	Ile	Val	Gly	Thr
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Gly	Ala	Glu	Val	Arg	Lys	Pro	Gly	Thr	Ser	Val	Arg	Ile	Ser	Cys	Arg
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Ala	Ser	Gly	Asn	Thr	Phe	Thr	Gly	His	His	Ile	His	Trp	Val	Arg	Gln
			20					25					30		
Ala	Pro	Gly	Gln	Gly	Leu	Gln	Trp	Met	Gly	Arg	Ile	Asn	Pro	Thr	Gly
		35					40					45			
Gly	Gly	Val	Ser	Leu	Ala	Gln	Ser	Phe	Gln	Asp	Arg	Val	Ser	Leu	Thr
	50					55				60					
Arg	Asp	Arg	Ser	Ser	Asn	Thr	Val	Phe	Leu	Glu	Leu	Ser	Gly	Leu	Thr
65					70					75					80
Glu	Glu	Asp	Thr	Ala	Leu	Tyr	Phe	Cys	Ala	Arg	Pro	Arg	Phe	Asn	Met
			85						90					95	
Ile	Arg	Glu	Pro	Leu	Asp	Leu	Trp	Gly	Gln	Gly	Thr	Val	Val	Thr	Val
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Thr	Ser	Gly	Phe	Ile	Phe	Asn	Ser	Tyr	Ala	Met	Asn	Trp	Val	Arg	Gln
			20					25					30		
Ala	Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val	Ser	Arg	Ile	Ser	Gly	Asn	Ser
		35					40					45			
Gly	Ser	Thr	Phe	Tyr	Ala	Asp	Ser	Val	Lys	Gly	Arg	Phe	Thr	Ile	Ser
	50					55				60					
Arg	Asp	Asn	Ser	Lys	Asn	Thr	Ala	Phe	Leu	Arg	Met	Asn	Ser	Gln	Arg
65					70					75					80
Ala	Glu	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Lys	Asp	Leu	Ser	Ser	Gly
			85						90					95	
Ala	Tyr	Tyr	Tyr	Tyr	Gly	Met	Asp	Val	Trp	Gly	Gln	Gly	Thr	Thr	Val
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Thr	Val	Ser	Ser												
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Val	Ser	Pro	Gly	Ser	Ile	Lys	Gly	Asp	Ser	Tyr	Phe	Trp	Ser	Trp	Val
			20					25					30		
Arg	Gln	Pro	Val	Gly	Lys	Gly	Leu	Glu	Trp	Ile	Gly	Arg	Ile	Tyr	Gly
		35					40					45			
Arg	Gly	Thr	Thr	Asn	Tyr	Asn	Arg	Val	Phe	Gly	Ser	Arg	Val	Ser	Met
	50					55				60					
Ser	Val	Asp	Met	Ser	Arg	Ser	Gln	Phe	Phe	Leu	Glu	Leu	Arg	Asp	Val
65					70					75					80
Thr	Ala	Ala	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Arg	Asp	Lys	Gly	Ser

				85					90					95					
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			100					105						110					
Phe	Ser																		

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Gly	Ala	Glu	Val	Lys	Lys	Pro	Gly	Ser	Ser	Val	Lys	Val	Ser	Cys	Arg				
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Ala	Ser	Gly	Gly	Thr	Phe	Ser	Arg	Tyr	Ala	Ile	Ser	Trp	Val	Arg	Gln				
			20				25						30						
Ala	Pro	Gly	Gln	Gly	Leu	Glu	Trp	Met	Gly	Gly	Ile	Ile	Pro	Pro	Phe				
		35					40					45							
Gly	Pro	Val	Asn	Tyr	Ala	Gln	Lys	Phe	Gln	Gly	Arg	Val	Thr	Ile	Thr				
		50				55					60								
Ala	Asp	Asp	Ser	Thr	Asn	Thr	Ala	Tyr	Met	Gly	Leu	Ser	Ser	Leu	Arg				
65					70					75					80				
Ser	Gly	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Arg	Val	Ala	Tyr	Asp	Gly				
			85						90					95					
Ser	Gly	Tyr	Tyr	Asn	Asn	Ile	Pro	Lys	Ile	Tyr	Tyr	Tyr	Ser	Tyr	Met				
		100						105						110					
Asp	Val	Trp	Gly	Lys	Gly	Thr	Thr	Val	Thr	Val	Ser	Ser							
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Ser	His	Thr	Met	His															
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Ser	Tyr	Thr	Phe	His															
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Gly His His Ile His
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Arg Tyr Ala Ile Ser
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Leu Ile Phe Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val Lys
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1 5 10 15
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<400> 27
Arg Ile Tyr Gly Arg Gly Thr Thr Asn Tyr Asn Arg Val Phe Gly Ser
1 5 10 15

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Gly Ile Ile Pro Pro Phe Gly Pro Val Asn Tyr Ala Gln Lys Phe Gln
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Gly

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Ser Leu Val Gly Thr Thr Ala Phe Asn Tyr

1 5 10

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1 5 10

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Tyr Tyr Ser Tyr Met Asp Val
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1 5 10

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Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala
1 5 10

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Lys Ser Ser Gln Ser Val Phe Tyr Thr Ser Asn Asn Lys Asn Tyr Leu
1 5 10 15
Ala

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1 5 10

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1 5 10

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 Gly Ala Ser Ser Arg Ala Thr
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 Gly Ala Ser Ser Arg Ala Thr
 1 5

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 1 5

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Gln Gln Tyr Gly Ser Ser Pro Arg Thr
1 5

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Gly Gly Gly Val Val Gln Pro Gly Arg Ser Leu Lys Leu Ser Cys Ala
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Ala Ser Gly Phe Thr Phe Ser
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Gly Gly Gly Val Val Gln Ala Trp Arg Ser Leu Arg Leu Ser Cys Val
1 5 10 15
Ala Ser Gly Phe Thr Phe Ser
20

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Gly Gly Gly Val Val Gln Pro Gly Arg Ser Leu Arg Leu Ser Cys Ala
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Ala Ser Gly Phe Thr Phe Ser
20

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1 5 10 15
Ala Ser Gly Asn Thr Phe Thr
20

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Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala
1 5 10 15
Thr Ser Gly Phe Ile Phe Asn
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<400> 62
Gly Pro Gly Leu Val Arg Pro Ser Gln Thr Leu Ser Leu Thr Cys Pro
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Val Ser Pro Gly Ser Ile Lys
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Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Arg
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Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ser
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<400> 69

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Met Asn Ser Leu Arg Ile Asp Asp Thr Ala Val Tyr Tyr Cys Ala Ile
20 25 30

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Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln
1 5 10 15
Leu Ser Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys Thr Asn
20 25 30

<210> 71

<211> 32

<212> PRT

<213> Homo sapiens

<400> 71

Arg Phe Thr Ile Ser Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln
1 5 10 15
Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ile
20 25 30

<210> 72

<211> 32
<212> PRT
<213> Homo sapiens

<400> 72
Arg Val Ser Leu Thr Arg Asp Arg Ser Ser Asn Thr Val Phe Leu Glu
1 5 10 15
Leu Ser Gly Leu Thr Glu Glu Asp Thr Ala Leu Tyr Phe Cys Ala Arg
20 25 30

<210> 73
<211> 32
<212> PRT
<213> Homo sapiens

<400> 73
Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Ala Phe Leu Arg
1 5 10 15
Met Asn Ser Gln Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys
20 25 30

<210> 74
<211> 32
<212> PRT
<213> Homo sapiens

<400> 74
Arg Val Ser Met Ser Val Asp Met Ser Arg Ser Gln Phe Phe Leu Glu
1 5 10 15
Leu Arg Asp Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

<210> 75
<211> 32
<212> PRT
<213> Homo sapiens

<400> 75
Arg Val Thr Ile Thr Ala Asp Asp Ser Thr Asn Thr Ala Tyr Met Gly
1 5 10 15
Leu Ser Ser Leu Arg Ser Gly Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

<210> 76
<211> 11
<212> PRT
<213> Homo sapiens

<400> 76
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 77
<211> 11
<212> PRT
<213> Homo sapiens

<400> 77

Trp Gly Gln Gly Thr Val Val Thr Val Ser Ser
1 5 10

<210> 78
<211> 11
<212> PRT
<213> Homo sapiens

<400> 78
Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
1 5 10

<210> 79
<211> 11
<212> PRT
<213> Homo sapiens

<400> 79
Trp Gly Gln Gly Ile Val Val Asn Val Phe Ser
1 5 10

<210> 80
<211> 11
<212> PRT
<213> Homo sapiens

<400> 80
Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
1 5 10

<210> 81
<211> 16
<212> PRT
<213> Homo sapiens

<400> 81
Pro Asp Ser Leu Ala Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys
1 5 10 15

<210> 82
<211> 16
<212> PRT
<213> Homo sapiens

<400> 82
Pro Ser Phe Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys
1 5 10 15

<210> 83
<211> 16
<212> PRT
<213> Homo sapiens

<400> 83
Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys
1 5 10 15

<210> 84

<211> 16
 <212> PRT
 <213> Homo sapiens

 <400> 84
 Pro Asp Ser Leu Ala Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys
 1 5 10 15

 <210> 85
 <211> 16
 <212> PRT
 <213> Homo sapiens

 <400> 85
 Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Gly Ala Thr Leu Ser Cys
 1 5 10 15

 <210> 86
 <211> 16
 <212> PRT
 <213> Homo sapiens

 <400> 86
 Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Gly Ala Thr Leu Ser Cys
 1 5 10 15

 <210> 87
 <211> 16
 <212> PRT
 <213> Homo sapiens

 <400> 87
 Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg Val Thr Leu Ser Cys
 1 5 10 15

 <210> 88
 <211> 15
 <212> PRT
 <213> Homo sapiens

 <400> 88
 Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
 1 5 10 15

 <210> 89
 <211> 15
 <212> PRT
 <213> Homo sapiens

 <400> 89
 Trp Tyr Gln Leu Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
 1 5 10 15

 <210> 90
 <211> 15
 <212> PRT
 <213> Homo sapiens

<400> 90
 Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
 1 5 10 15

 <210> 91
 <211> 15
 <212> PRT
 <213> Homo sapiens

 <400> 91
 Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
 1 5 10 15

 <210> 92
 <211> 15
 <212> PRT
 <213> Homo sapiens

 <400> 92
 Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
 1 5 10 15

 <210> 93
 <211> 15
 <212> PRT
 <213> Homo sapiens

 <400> 93
 Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
 1 5 10 15

 <210> 94
 <211> 15
 <212> PRT
 <213> Homo sapiens

 <400> 94
 Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
 1 5 10 15

 <210> 95
 <211> 32
 <212> PRT
 <213> Homo sapiens

 <400> 95
 Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 1 5 10 15
 Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
 20 25 30

 <210> 96
 <211> 32
 <212> PRT
 <213> Homo sapiens

 <400> 96
 Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr

1	5	10	15
Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys			
20	25	30	

<210> 97
 <211> 32
 <212> PRT
 <213> Homo sapiens

<400> 97												
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr												
1	5	10	15									
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys												
20	25	30										

<210> 98
 <211> 32
 <212> PRT
 <213> Homo sapiens

<400> 98												
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr												
1	5	10	15									
Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys												
20	25	30										

<210> 99
 <211> 32
 <212> PRT
 <213> Homo sapiens

<400> 99												
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ser												
1	5	10	15									
Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Thr Gly Thr Tyr Tyr Cys												
20	25	30										

<210> 100
 <211> 32
 <212> PRT
 <213> Homo sapiens

<400> 100												
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr												
1	5	10	15									
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys												
20	25	30										

<210> 101
 <211> 32
 <212> PRT
 <213> Homo sapiens

<400> 101												
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr												
1	5	10	15									
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys												
20	25	30										

<210> 102
<211> 14
<212> PRT
<213> Homo sapiens

<400> 102
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
1 5 10

<210> 103
<211> 14
<212> PRT
<213> Homo sapiens

<400> 103
Phe Gly Gly Gly Ala Lys Val Gly Ile Arg Arg Thr Val Ala
1 5 10

<210> 104
<211> 14
<212> PRT
<213> Homo sapiens

<400> 104
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
1 5 10

<210> 105
<211> 14
<212> PRT
<213> Homo sapiens

<400> 105
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
1 5 10

<210> 106
<211> 14
<212> PRT
<213> Homo sapiens

<400> 106
Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
1 5 10

<210> 107
<211> 14
<212> PRT
<213> Homo sapiens

<400> 107
Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
1 5 10

<210> 108
<211> 14
<212> PRT
<213> Homo sapiens

<400> 108
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
1 5 10

<210> 109
<211> 332
<212> DNA
<213> Homo sapiens

<400> 109
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tcagtagtca tggctcgcac tgggtccgcc aagctccagg caaggggctg gagtgggtgg 120
cacttttgtc gtctgatgga agtaataaat tctatataga atccgtgaag ggccgattca 180
ccatctccaa ggacaattct aagaacacac tgtatctgca aatgaacagc ctgagaattg 240
acgacacggc tgtctattac tgtgcgattt ccctgggtgg aactaccgct tttaactact 300
ggggccaggg aaccctggtc accgtctcct ca 332

<210> 110
<211> 331
<212> DNA
<213> Homo sapiens

<400> 110
ggcgtggtcc aagcatggag gtccctaaga ctctcctgtg tagcctgtgg attcaccttc 60
agtagtcata ccattgcactg ggtccgccag gctccaggca aggggctgga gtgggtggca 120
cttatattct atgatggaag taataaatac tatgcagact ccgtgaaggg ccgattcacc 180
atctccagag acaattccaa gaacacgctg tatctgcaat tgagcagcct aagacctgag 240
gacacggctg tctattattg tacgaattcc gaggtgggag ctaccgcttt tgactactgg 300
ggccagggaa ccctggtcac cgtctcctca g 331

<210> 111
<211> 335
<212> DNA
<213> Homo sapiens

<400> 111
ggggaggcgt ggtccagcct gggagggtccc tgagactttt cctgtgcagc ctctggattc 60
accttcagtt cctatacttt ccactgggtc cgccaggctc caggcaaggg gctggagtgg 120
gtggcagtta tatcatatga tggaaacaag aaatactacg cagactccgt gaagggccga 180
ttcaccatct ccagagacaa ttccaagaac actctatatc tgcaaatgaa cagcctgaga 240
gttgaggaca cggtgtgtta ttactgtgctg atttccatag tgggaactac cgcttttaac 300
tactggggcc agggaaacct ggtcaccgtc tcctc 335

<210> 112
<211> 327
<212> DNA
<213> Homo sapiens

<400> 112
ccagactccc tggctgtgtc tctgggagag agggccacca tcaactgcaa gtccagccag 60
agtgtttttt acacttccaa caataagaac tacttagctt ggtaccagca gaaaccaggc 120
cagcctccta agttgtctat ttactgggca tccaccggg aatccggggt ccctgaccga 180
ttcagtgga ggggtctgg gacagatttc actctacca tcagcagcct gcaggctgaa 240
gatgtggcag tttattactg tcagcaatat tatgattcgt acacttttgg ccaggggacc 300
aagctggaga tcaaacgaac tgttggt 327

<210> 113
<211> 312

<212> DNA
<213> Homo sapiens

<400> 113
ccatccttcc tgtctgcatc tgtaggagac agagtcacca tcacttgccg ggccagtcac 60
ggcattagca gttatttagc ctggtatcag ctaaaaccgg ggaaagcccc taagctcctg 120
atctatgctg catccacttt gcaaagtggg gtcccatcaa gggtcagcgg cagtggatct 180
gggacagaat tcactctcac aataagcagc ctgcagcctg aagattttgc aacttattac 240
tgtcaacagc ttaatagtta ccctctcact ttcggcggag gggccaaggt ggggatcaga 300
cgaactgtgg ct 312

<210> 114
<211> 315
<212> DNA
<213> Homo sapiens

<400> 114
ccaggcacc c tgtctttgtc tccaggggaa agagccacc c tctcctgcag ggccagtcag 60
agtgttagca gcagctactt agcctggtac cagcagaaac ctggccaggc tcccaggctc 120
ctcatctatg gtgcattccag cagggccact ggcattccag acaggttcag tggcagtggt 180
tctgggacag acttcactct caccatcagc agactggagc ctgaagattt tgcagtgtat 240
tactgtcagc agtatggtag ctcacctcgg acgttcggcc aagggaccaa ggtggaaatc 300
aaacgaactg tggct 315

<210> 115
<211> 327
<212> DNA
<213> Homo sapiens

<400> 115
ccagactccc tggctgtgtc tctgggagg agggccacca tcaactgcaa gtccagccag 60
agtgtttttt acacttccaa caataagaac tacttagctt ggtaccagca gaaaccaggc 120
cagcctccta agttgtctcat ttactgggca tccacccggg aatccggggg ccttgaccga 180
ttcagtgga ggggtctg gacagatttc actctacca tcagcagcct gcaggctgaa 240
gatgtggcag tttattactg tcagcaatat tatgattcgt acacttttgg ccaggggacc 300
aagctggaga tcaaacgaac tgtggct 327

<210> 116
<211> 315
<212> DNA
<213> Homo sapiens

<400> 116
ccaggcacc c tgtcattgtc tccaggggaa ggagccacc c tctcctgcag ggccagtcag 60
agtgttagca gcagctacct agcctggtat cagcagagac ctggccaggc tcccaggctc 120
ctcatctatg gtgcattccag cagggccacc ggcattccag acagattcag tggagtgga 180
tctgggacag atttcagttt caccatcagc agtctgcagc ctgaagatac tgggacatat 240
tactgtcaac aatatgataa tgtccctgac acttttgcc aggggaccag gctggagatc 300
aaacgaactg tggct 315

<210> 117
<211> 312
<212> DNA
<213> Homo sapiens

<400> 117
ccaggcacc c tgtctttgtc tccaggggaa ggagccacc c tctcctgcag ggccagtcag 60
agtgttagca gcagctactt agcctggtac cagcagaaac ctggccaggc tcccaggctc 120

ctcatctatg	gtgcatccag	tagggccact	ggcatcccag	acaggttcag	tggcagtggg	180
tctgggacag	actttactct	caccatcagc	agactggagc	ctgaagattt	tgcagtgtat	240
tactgtcagc	agtatggtac	ctcacccctc	ttcggccaag	ggacacgact	ggagattaaa	300
cgaactgtgg	ct					312

<210> 118
 <211> 315
 <212> DNA
 <213> Homo sapiens

<400> 118						
ccaggcaccc	tgtctttgtc	tccaggggaa	agagtcactc	tctcctgcag	ggccagtcag	60
agtgttagca	gcagttactt	agcctgggtac	cagcagaaac	ctggccaggc	tcccaggctc	120
ctcatctatg	gtgcatccag	caggggccact	ggcatcccag	acaggttcag	tggcagtggg	180
tctgggacag	actttactct	caccatcagc	agactggagc	ctgaagactt	tgcagtttat	240
tactgtcagc	agtatgggaa	ctcacctcgg	acgttcggcc	aagggaacaa	ggtgggaaatc	300
aaacgaactg	tggct					315

<210> 119
 <211> 342
 <212> DNA
 <213> Homo sapiens

<400> 119						
ggggctgagg	gtgaggaagc	ccggacctcc	gtgaggatct	cttcagggc	atctggaaac	60
accttactcg	gccaccatat	tactgggtc	cgccaggccc	ctggacaagg	ccttcagtgg	120
atgggaagaa	tcaacccgac	tggcggcggc	gttagtctcg	cacagagttt	ccaggacaga	180
gtcagcctga	ccagggacag	gtcgtccaat	acagtcttct	tggaaactgag	cggcctcacg	240
gaggaggaca	cggccttata	tttctgtgcg	aggccccgat	ttaacatgat	cgggaacct	300
cttgacctct	ggggccaggg	gacagtggtc	accgtctcct	ca		342

<210> 120
 <211> 348
 <212> DNA
 <213> Homo sapiens

<400> 120						
gggggagggt	tgggtacagc	tgggggggtcc	ctgagactct	cctgtgcaac	ctctggattc	60
atctttaaca	gctatgccat	gaactgggtc	cgccaggctc	cagggaaggg	gcttgagtgg	120
gtctcacgta	ttagtggaag	tagtggaagc	acattctacg	cagactccgt	gaagggccgg	180
ttcaccatct	ccagagacaa	ttccaagaac	acggcggttc	tgcgaatgaa	cagccagaga	240
gccgaagaca	cggccgttta	ttactgtgcg	aaagatctgt	cgagtgggtc	atactactac	300
tacgggatgg	acgtctgggg	ccaagggacc	acggtcaccg	tctcctca		348

<210> 121
 <211> 342
 <212> DNA
 <213> Homo sapiens

<400> 121						
ggcccaggat	tgggtaggcc	atcacagacc	ctatccctca	cctgcactgt	ctctccaggc	60
tccattaaag	gtgatagtta	cttctggagc	tgggtccgtc	agcccgtagg	gaagggactg	120
gagtggatag	ggcgtatcta	cggcagaggg	actaccaatt	acaaccgtgt	tttcgggagt	180
cgagtcagta	tgtcagtggg	catgtccagg	agtcagtttt	tcttggaatt	gagagatgtg	240
accgcgcgag	acacggccgt	ctattactgt	gcgagagaca	aggggtccga	atactcctac	300
tttgaccctt	ggggccaggg	aatagtggtc	aacgtcttct	ca		342

<210> 122

<211> 376
<212> DNA
<213> Homo sapiens

<400> 122
gggctgaggt gaagaagcct gggtcctcgg tgaaggtctc ctgcagggct tctggaggca 60
cattcagcag atatgctatc agctgggtgc gacaggcccc tggacaaggg cttgagtgga 120
tgggagggat catccctccc ttggtccag taaactacgc acagaagttc cagggcagag 180
tcacgattac cgcggacgat tccacgaaca cagcctacat gggctctgagc agcctgagat 240
ctggggacac ggccgtgtat tactgcgcga gagtggccta tgatggtagt ggctattaca 300
acaatatccc aaagatctac tactactcct acatggacgt ctggggcaaa gggaccacgg 360
tcaccgtgtc ctcagc 376

<210> 123
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> A flexible five amino acid tether.

<400> 123
Gly Gly Gly Gly Ser
1 5
